

What is claimed is:

1. A process for producing a three-dimensional object,
which comprises

the steps of

- a) providing a layer of a pulverulent substrate
- b) controlling the temperature of the manufacturing chamber
- c) selective application of an absorber in a suspension or of a liquid absorber via an inkjet process to the regions to be sintered
- d) application of other specific liquids or suspensions with certain properties
- e) selective melting of regions of the powder layer by means of introduction of electromagnetic energy via a laser of wavelength from 100 to 3000 nm
- f) cooling of the molten and non-molten regions to a temperature which allows the moldings to be removed intact
- g) removal of the moldings.

2. The process as claimed in claim 1,
wherein

step e) is first carried out once, and then steps a) to d) are carried out once, and then step b) is carried out and step a) is carried out again once, and then the other steps are carried out in the sequence c), d), a), b), and e).

3. The process as claimed in either/and of claims 1 and 2,
wherein

the pulverulent substrate used has a median grain size of from 10 to 150 μm .

4. The process as claimed in at least one of claims 1 to 3,
wherein
use is made of a laser of wavelength from 800 to 1070 nm.

5. The process as claimed in at least one of claims 1 to 3,
wherein

← - - - **Formatiert:** Nummerierung
und Aufzählungszeichen

← - - - **Formatiert:** Nummerierung
und Aufzählungszeichen

← - - - **Formatiert:** Nummerierung
und Aufzählungszeichen

← - - - **Formatiert:** Nummerierung
und Aufzählungszeichen

use is made of a laser of wavelength from 1900 to 2100 nm.

6. The process as claimed in at least one of claims 1 to 3,
wherein
5 use is made of an Nd:YAG laser.

7. The process as claimed in at least one of claims 1 to 3,
wherein
use is made of a diode laser.

8. The process as claimed in at least one of claims 1 to 3,
wherein
use is made of a laser with unfocused, linear or spread beam.

9. The process as claimed in at least one of claims 1 to 8,
wherein
the absorber comprises colorants.

10. The process as claimed in claim 9,
wherein
the absorber comprises pigments.

11. The process as claimed in claim 9,
wherein
the absorber comprises dyes.

12. The process as claimed in at least one of claims 1 to 8,
wherein
the absorber comprises carbon black, CHP, animal charcoal, graphite, carbon fibers, chalk,
or interference pigments.

13. The process as claimed in at least one of claims 1 to 8,

Formatiert: Nummerierung
und Aufzählungszeichen

Formatiert: Nummerierung
und Aufzählungszeichen

wherein

the absorber comprises other components alongside carbon black, CHP, animal charcoal, graphite, carbon fibers, chalk, or interference pigments.

5 14. The process as claimed in at least one of claims 1 to 8,

wherein

the absorber comprises flame retardants based on phosphorus or melamine cyanurate.

15. The process as claimed in at least one of claims 9 to 14,

10 wherein

the absorber also comprises distilled water, or alcohol, or solvent.

16. The process as claimed in at least one of claims 9 to 14,

wherein

15 the absorber also comprises a surfactant and/or wetting agent and/or biocide and/or moisture retainer.

17. The process as claimed in any one of claims 1 to 16,

wherein

20 the pulverulent substrate used comprises polymers.

18. The process as claimed in any one of claims 1 to 16,

wherein

25 the pulverulent substrate used comprises sand, metal particles, or ceramic particles, which have been encapsulated by a polymeric material.

19. The process as claimed in claim 17 or 18,

wherein

30 the polymer is a homo- or copolymer preferably selected from polyester, polyvinyl chloride, polyacetal, polypropylene, polyethylene, polystyrene, polycarbonate, polybutylene terephthalate, polyethylene terephthalate, polysulfone, polyarylene ether, polyurethane, thermoplastic elastomers, polylactides, polyoxyalkylenes, poly(N-

methacrylimides) (PMMI), polymethyl methacrylate (PMMA), ionomer, polyamide, copolyester, copolyamides, silicone polymers, terpolymers, acrylonitrile-butadiene-styrene copolymers (ABS), and mixtures thereof.

- 5 20. The process as claimed in any of claims 17 to 19,
wherein
use is made of a pulverulent substrate which comprises from 0.05 to 5% by weight of a
powder-flow aid.
- 10 21. The process as claimed in any of claims 17 to 20,
wherein
use is made of a pulverulent substrate which comprises inorganic fillers.
22. The process as claimed in claim 21,
15 wherein
the filler used comprises glass beads.
23. The process as claimed in at least one of claims 17 to 22,
wherein
20 use is made of a pulverulent substrate which comprises inorganic or organic pigments.
24. An apparatus for the layer-by-layer production of three-dimensional objects,
which comprises
- a movable apparatus for the layer-by-layer application of a pulverulent substrate to an
25 operating platform or to a layer of a treated or untreated pulverulent substrate (2)
which may at this stage be present on the operating platform,
 - an apparatus (3) movable in the x, y plane, for the application of a material (4)
comprising an absorber and optionally of other additives to selected regions of the
layer composed of pulverulent substrate, and
 - 30 - a laser of a wavelength from 100 to 3000 nm.
25. A molding produced by a process as claimed in any of claims 1 to 24.

O.Z. 6325

27

26. The molding as claimed in claim 25,

which comprises

fillers selected from glass bead or silicas or metal particles, or comprises aluminum

5 particles.